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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/485,325

05/22/2000

JUERGEN HAHN

10191/1295

1777

26646

7590

01/29/2003

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EXAMINER

STOCK JR, GORDON J

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 01/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/485,325

Applicant(s)

HAHN ET AL.

Examiner

Gordon J Stock

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 9-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. The Amendment filed on November 6, 2002 has been entered into the file.

#### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 9, 10, and 14-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Finarov (5,764,365)**.

As to **claim 9**, Finarov discloses a measurement apparatus comprising:

a light source emitting a beam (Fig. 5c, **120, 130, 132**; col. 7, lines 9-67); a transmitting optical system conveying the beam to an incidence point on the substrate (Fig. 5b, **100, 150, 154**; col. 7, lines 24-58); a photodetector device (Fig. 5c, **186, 170, 172, 198**); a receiving optical system conveying the reflected beam to the photodetector device (Fig. 5c, **156, 152, 102**; col. 7, lines 35-37; col. 8, lines 46-64); the receiving optical system including an analyzer (Fig. 5c, **160**); an evaluation device, a data processor (col. 11, lines 19-20); an angle measurement device sensing an angle of the reflected beam relative to a tangential plane of the substrate at the incidence point (Fig. 5c, **152, 194, 196, and 198**; col. 10, lines 65-67; col. 11, lines 1-6); the polarization direction of the beam and of the analyzer being modified in time relative to one another (Fig. 5b, **124 and 140**; Fig. 5c, **160 and 162**)

Finarov is silent concerning the determination of the film thickness as a function of the sensed angle and the intensity changes. However, it is obvious to one skilled in the art that the data processor does determine the film thickness as a function of intensity and as a function of the sensed angle, for it is well known in the art that the film thickness is a function of intensity change and angle of incidence.

As for the tangential plane not intersecting the substrate in an area of incidence, Finarov is silent in respects with the embodiments of Figs. 5b and 5c. However, Finarov teaches in Fig. 2, the incident angle is derived from an angle made with the mirror and the beam that is parallel to the scanning axis (col. 5, lines 20-45), and Fig. 4, 5b, and 5c utilize principles of Fig. 2 (col. 4, lines 33-55), and therefore, the plane that the beam occupies also is parallel to the scanning axis. It would be obvious to one skilled in the art at the time the invention was made that the tangential plane that the beam which is parallel to the scanning axis occupies is not intersecting the substrate in an area of incidence, for the plane would be parallel to the scanning axis as is the beam occupying it.

As to **claim 10**, Finarov discloses everything as above (see **claim 9**), in addition, Finarov discloses the angle measurement device including a photodetector unit that is position-sensitive in at least one of an X and Y direction (col. 11, lines 1-6) with an angle of reflection being calculated from position data and distance data with an evaluation stage (col. 11, lines 7-21).

As to **claim 14**, Finarov discloses everything as above (see **claim 9**). In addition, Finarov discloses a converging lens arranged in front of the photodetector device (Fig. 5c, **168**).

As to **claim 15**, Finarov discloses everything as above (see **claim 9**). In addition, Finarov discloses the transmitting and receiving optical system are integrated into a common carrier (Fig.

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4). In another embodiment, Finarov discloses a stationary support for holding a sample in the ellipsometer of Figure 2 (col. 5, lines 10-15). It would have been obvious to one skilled in the art at the time the invention was made to have a stationary three-point support for holding a sample in a common carrier of a portable system because the three-point support is a preferred support for three points define a plane making the sample flat and the support keeps the sample stationary throughout the measurement process.

As to **claim 16**, Finarov discloses everything as above (see **claim 9**). In addition, Finarov discloses the transmitting optical system including a polarizer (Fig. 5b, **124**) and a quarter wave plate (Fig. 5b, **122**) in a beam path of the beam. Finarov discloses the polarizer and the analyzer being arranged in rotationally driven fashion about an axis normal to a surface of the one of the polarizer and the analyzer; whereas, Finarov discloses "the polarizer having associated therewith motor drives (Fig. 5b, **140**). Although, not shown, motor drives typically operate with precise angular encoders. (col. 8, lines 25-28)." In addition, Finarov discloses the analyzer being similar to the polarizer (col. 8, lines 55-57) with a motor (Fig. 5c, **162**).

4. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Finarov (5,764,365)** in view of **Gold et al. (4,999,014)**.

As to **claim 11**, Finarov discloses a measurement apparatus comprising:

a light source emitting a beam (Fig. 5c, **120, 130, 132**; col. 7, lines 9-67); a transmitting optical system conveying the beam to an incidence point on the substrate (Fig. 5b, **100, 150, 154**; col. 7, lines 24-58); a photodetector device (Fig. 5c, **186, 170, 172, 198**); a receiving optical system conveying the reflected beam to the photodetector device (Fig. 5c, **156, 152, 102**; col. 7, lines 35-37; col. 8, lines 46-64); the receiving optical system including an analyzer (Fig. 5c,

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160); an evaluation device, a data processor (col. 11, lines 19-20); an angle measurement device sensing an angle of the reflected beam relative to a tangential plane of the substrate at the incidence point (Fig. 5c, 152, 194, 196, and 198; col. 10, lines 65-67; col. 11, lines 1-6); the polarization direction of the beam and of the analyzer being modified in time relative to one another (Fig. 5b, 124 and 140; Fig. 5c, 160 and 162). In addition, Finarov is silent concerning the determination of the film thickness as a function of the sensed angle and the intensity changes. However, it is obvious to one skilled in the art that the data processor does determine the film thickness as a function of intensity and as a function of the sensed angle, for it is well known in the art that the film thickness is a function of intensity change and angle of incidence. Finarov also discloses the angle measurement device including a photodetector unit that is position-sensitive in at least one of an X and Y direction (col. 11, lines 1-6) with an angle of reflection being calculated from position data and distance data with an evaluation stage (col. 11, lines 7-21).

Finarov is silent concerning the same photodetector sensing both intensity changes and position data. However, Gold in an apparatus for measuring thickness of thin films teaches a detector that measures intensity changes and positional data, the positional data as a function of angle of incidence (col. 6, lines 9-40). It would be obvious to one skilled in the art at the time the invention was made to have the apparatus comprise a photodetector sensing both intensity changes and position data to minimize the cost through the use of fewer photodetectors.

5. **Claims 12-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Finarov (5,764,365)** in view of **Tokuhashi et al. (5,838,432)**.

As for **claim 12**, Finarov discloses everything as above (see **claim 9**). Finarov is silent concerning the photodetector unit including two position-sensitive photodetectors whereas the angle is calculated based on differing positions of the beam on the two position-sensitive photodetectors. Tokuhashi in an angle detection apparatus teaches utilizing two one-dimensional PSD whereas the angle is calculated based on the beam positions on the photodetectors and that one dimensional photodetectors are cheaper than two dimensional psd's (col. 14, lines 5-35). Therefore, it would be obvious to one skilled in the art to have the apparatus comprise two one-dimensional psd's wherein the angle is calculated based on the beam positions on the photodetectors rather than one two-dimensional psd, for one dimensional psd's are much cheaper than two-dimensional psd's.

As for **claim 13**, Finarov in view of Tokuhashi disclose everything as above (see **claim 12**). In addition, Finarov discloses a beamsplitter arranged in the beam path of the reflected beam in front of the psd (Fig. 5c, 194). However, they are silent concerning the arrangement of the beamsplitter with the two one-dimensional psd's. However, it would be obvious to one having ordinary skill in the art to arrange the beamsplitter and the two photodetectors in order for the two photodetectors to receive the partial beam of the reflected beam from the beamsplitter, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70.

### ***Response to Arguments***

6. As for the arguments concerning the tangential plane in **claims 9, 10, 14-16**, refer to the claim 9 rejection above. From Finarov, Figs. 4, 5b, and 5c derive their principles from Fig. 2 (col. 4, lines 30-55). Fig. 2 discloses the incident angle is derived from an angle that is made

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from a mirror and a beam parallel to the scanning axis. The plane that this beam occupies would also be parallel to the scanning axis and parallel to the substrate; therefore, this plane does not intersect near the area of incidence.

As for the argument concerning **claim 15**, Finarov discloses a common carrier for the transmitting optical system and the receiving optical system (Fig. 4).

Applicant's arguments with respect to **claims 12 and 13** have been considered but are moot in view of the new ground(s) of rejection.

As for the allowable subject matter as set forth in the prior office action, the Examiner apologizes for the inconvenience caused by the grounds of rejection for **claim 11**, but after performing an updated search, the Examiner found grounds of rejection for **claim 11**.

### *Conclusion*

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.



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***Fax/Telephone Numbers***

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

- 1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and
- 2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

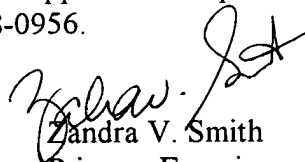
*Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (703) 308-7722*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (703) 305-4787. The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

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gs

January 21, 2003

  
Zandra V. Smith  
Primary Examiner  
Art Unit 2877